REMARKS

Applicants thank the Examiner for identifying allowable subject matter in claim 6. Applicant by the foregoing amendment has canceled claim 6 and rewritten the claim in independent form as new claim 16. Claims 1-5 and 7-16 are now pending in this application.

In the office action, claims 4-13 were objected to as containing various informalities. By the foregoing amendment, Applicants have corrected these informalities in accordance with the Examiner's suggestions. Claims 1 and 4 were rejected under 35 U.S.C. § 112. Applicants have amended claims 1, 4, 7 and 11 to correct informalities and clarify the claimed subject matter. Applicants respectfully submit that the claims as amended are in condition for allowance.

Claims 1-5, 14 and 15 were rejected under 35 U.S.C. § 102(e) in view of U.S. Patent No. 6,343,141 to Okada et al. (hereinafter "Okada"). Claims 7-13 were rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Okada in view of U.S. Patent No. 6,275,614 to Krishnamurthy et al. (hereinafter "Krishnamurthy"). Applicants respectfully traverse these rejections of record, and further submit that claims 1-5 and 7-16 as amended are in condition for allowance.

Rejections under 35 U.S.C. § 102(e)

Claims 1-5 and 15 were rejected as allegedly anticipated by Okada.

Independent claim 1 as amended recites a method for identifying face regions in a color image which comprises,

> providing image representative data including data representative of chrominance for incremental portions of said image;
> comparing said chrominance representative data for each incremental image portion to chrominance values known to be representative of skin tones, to thereby distinguish image portions representing skin tone colors from other image portions; and
> comparing said shapes of image portions representing skin tone colors to at least one template consistent with the shape of a human face image to thereby identify possible face regions.

Okada is directed to an apparatus for detecting skin areas in video sequences. (Abstract). However, Okada does not teach or suggest the invention recited in claim 1, which provides a method for face detection which, as stated in the objects of the invention, has a short processing

time and provides high probability of identifying face regions with low false alarm rates. (*See* Specification, p. 3, lines 16-18).

First, claim 1 recites *chrominance values known to be representative of skin tones*. In the method of Okada, candidate face regions are detected by first using edge/shape criterion and signal energy characteristics. Then all pixels in these candidate regions are considered skin tone pixels. The color tones of such pixels are used to estimate representative skin tone range. The estimated skin tone range is then used to detect possible skin tone regions in other locations in the current frame or subsequent frames. Okada is fundamentally different from claim 1 in at least this sense. In accordance with the claimed invention, the representative skin tone model is estimated offline, *before* the processing of the current frame. The estimation process may include manual identification of some skin regions from which representative skin tones are computed. In processing a new image, the skin tone model is used as the first criterion to detect possible regions, followed by, in various embodiments, checking the spatial energy characteristics, then the DC energy, and finally the shape condition. This is fundamentally different from the method of Okada, in which shape condition is checked first, and *then* signal energy characteristics are analyzed to identify candidate regions. The skin tone model is dynamically estimated from the candidate regions (after checking just the shape and signal energy conditions) from each image, rather than a consistent model estimated offline possibly from a set of manually labeled training data. Accordingly, because Okada fails to disclose or suggest the *chrominance values known to be representative of skin tones* of claim 1, Okada cannot anticipate claim 1.

Furthermore, nowhere in the cited portions of Okada is it taught, suggested, or disclosed that a single method be used which incorporates both the steps of *comparing said chrominance representative data ... to thereby distinguish image portions representing skin tone colors from other image portions*, and *comparing said shapes of image portions representing skin tone colors to at least one template consistent with the shape of a human face image to thereby identify possible face regions*. Indeed, these two steps are used importantly in combination to decrease processing time and accuracy (*See* Specification, p. 3, lines 16-18). The cited portions of Okada include no discussion of improved processing performance. For at least this additional reason, Okada cannot properly be used to anticipate claim 1.

Additionally, Okada fails to disclose or suggest that the data includes chrominance data for *incremental portions of said image*, as expressed in claim 1. The portion of Okada cited by the Examiner as teaching this limitation, i.e., col. 4, lines 43-54, fails to disclose or suggest at least this limitation. Okada thus fails to disclose or suggest all elements of claim 1, and therefore cannot anticipate claim 1.

Furthermore, Okada fails to disclose or suggest comparing shapes to a *template consistent with the shape of a human face image.* Because the reference fails to disclose such a template, the reference cannot properly anticipate claim 1 for at least this additional reason.

Claim 15 contains similar limitations to those discussed above with respect to claim 1, and is in condition for allowance for at least those reasons set forth above.

Furthermore, dependent claims 2-5 depend from claim 1 and thus contain all of the limitations of the claim 1. Accordingly, for at least the reasons set forth above, Okada fails to disclose or suggest at least several elements of claims 2-5 and cannot therefore anticipate these claims.

Applicant respectfully submits that claims 1-5 and 15 are in condition for allowance for at least the foregoing reasons.

Rejections under 35 U.S.C. § 103(a)

Claims 7-13 were rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Okada in view of U.S. Patent No. 6,275,614 to Krishnamurthy et al. (hereinafter "Krishnamurthy"). However, Applicants note that the priority date of the Krishnamurthy reference is June 26, 1998, the date of the filing of the related provisional application. The present application, however, claims priority under 35 U.S.C. § 363 to the related international application (PCT application PCT/US97/20024), which was filed on November 4, 1997. Accordingly, the Krishnamurthy reference is not prior art to the present invention since it was filed laer in time, and the rejections under 35 U.S.C. § 103(a) in view of this reference are improper. Applicants respectfully request that these rejections be removed.

Accordingly, Applicants respectfully submit that at least claims 7-13 and new claim 16 are in condition for allowance.

CONCLUSION

In view of the foregoing amendment and remarks, favorable reconsideration and allowance of claims 1-5 and 7-16 are respectfully solicited. In the event that the application is not deemed in condition for allowance, the Examiner is invited to contact the undersigned in an effort to advance the prosecution of this application.

Respectfully submitted,

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